



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1.140.001 WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/NL 03/00790	International filing date (day/month/year) 10.11.2003	Priority date (day/month/year) 18.11.2002
International Patent Classification (IPC) or both national classification and IPC B65D1/36		
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<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 9 sheets.</p>
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/NL 03/00790**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-6 filed with telefax on 03.09.2004

Claims, Numbers

1-15 filed with telefax on 03.09.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	
Inventive step (IS)	Yes: Claims	1-15
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step, or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following document:
D1: US-A-4013798
- 2 The subject-matter of claim 1 differs therefore from the disclosure of D1 in that the passage openings of the individual compartments differ from each other such that overpressure in the individual compartments is maximized at different pressure levels.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to provide a package which is more efficient in use, whereby both less material and less energy are required for heating at different temperatures the products.

The solution to this problem proposed in the characterising portion of claim 1 is not disclosed nor suggested by the available prior art, and thus, claim 1 is considered as involving an inventive step (Article 33(3) PCT).

- 3 Claims 2-11 are dependent on claim 1 and as such meet the requirements of the PCT with respect to novelty and inventive step.
- 4 Independent claim 12 which relates to a method of heating a plurality of products contains the same inventive concept, and thus, this claim as well as the dependent claims 13 to 15 meet also the requirements of the PCT with respect to novelty and inventive step.

For sake of completeness, it is mentioned that the terms "the compartments (4, 5, 6, 21, 22) which is bounded by passage openings" used in claim 12 should have been corrected by the following expression "the compartments (4, 5, 6, 21, 22) which are bounded by passage openings" and that the features of claim 15 relate to the use of the container rather than defining a method for heating a plurality of products (Article

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6 PCT).

Package and method for heating a plurality of products

The invention relates to a package for containing a plurality of products for heating, in particular food products according the preamble claim 1. The invention also relates to
5 a method for heating a plurality of products according the preamble of claim 12.

There has been a considerable increase in the use of meals which are simple to prepare. An example hereof is formed by the prepared meals which only need to be heated to be suitable for consumption. Such means are usually precooked and then cooled until
10 shortly before the moment of use. Such meals are applied inter alia for home use and for use in institutions, hospitals and schools. Heating of the cooled meal can take place in diverse ways, although the most usual is placing of the package in hot water or placing of the package in an oven. A drawback of these meals and the method of heating thereof is that all components making up the meal undergo the same heating.
15 This detracts from the possibilities of preparing appetizing and healthy meals in this manner. Determined ingredients must for instance not become too hot in order to remain optimally vitamin-rich (for instance vegetables), other ingredients must not exceed a different specific temperature because this damages the texture or structure (for instance sauces), while conversely a third ingredient must exceed a specific
20 temperature so as to be fully cooked or to kill bacteria (for instance meat or poultry). In addition, there may also be culinary reasons for desired temperature differences between different meal components.

US 4,013,798 discloses a ventable package and a micro-wave shielding device for
25 heating food, said package comprising a plurality of separated sealed compartments to be filled with food products. At least two, but less than all of said compartments defining ventable compartments. One portion of the seal being sufficiently weak as to rupture in response to build up of water vapor beyond a predetermined pressure level in a compartments whereby the water vapor may
30 vent, through said ventable compartments and through the ruptured seal. For generating different temperatures in the different compartments a shielding box having apertures is provided. The shielding box is formed from a material which is opaque to microwave energy to selectively control the different degrees of exposure of food within the different compartments and thus to vary the temperatures of the

food in different compartments while using a single microwave source in heating the package.

- 5 The object of the present invention is to provide a package and method with which a plurality of products brought together in a single container can be heated in simple manner with a single heating source, wherein the diverse products are heated to different temperatures resulting from different pressures in different separated compartments.
- 10 The invention provides for this purpose a package according claim 1. The temperature will stabilize at a determined value depending on the pressure applied to a product during the heating. Compare for instance the pressure cooker in which a relatively high pressure is realized, resulting in a higher cooking temperature, and a mountain climber who at high altitude already boils water at 80°C. By now connecting different passage
- 15 openings (different pressure valves) to the different compartments, it will also be possible to realize different pressures (and therefore also temperatures) in the different compartments. This while the package still only need be heated with a single heating source, so that no complex operations are required for the heating. In addition to food at varying temperatures, non-food products can also be heated in this manner, optionally
- 20 in combination with food products (for instance a so-called hot towel). In a preferred embodiment the compartments are shielded from the environment by making use of a material layer, such as for instance a transparent plastic foil, so that a view of the products in the container can be provided with minimal use of material. The use of a shielding box according the prior art is superfluous and makes the present
- 25 invention more efficient in use as both less material and less energy is required in heating the products. Furthermore the package according the invention can be heated with all different heat sources known for heating the products and not only in a micro wave oven as disclosed in the closest prior art.
- 30 In order to prevent undesirable exchange of gas between the environment and the interiors of the compartments, the passage openings are preferably blocked prior to use of the package, and open under the influence of pressure in the compartments. This guarantees a medium-tight closure of the compartments prior to use (heating) of the package. The result hereof is that perishable goods can be preserved for longer. Only

when the operation of the passage openings becomes relevant are they opened (when a determined pressure is reached). Another option for ensuring closure of the passage openings before the start of heating can be realized in accordance with an embodiment variant in that the passage openings are blocked prior to use of the package, and open
5 under the influence of a determined temperature being exceeded. This measure can also be applied in combination with opening of the passage openings under the influence of pressure, and this then results in increased certainty that the openings do not open prematurely (for instance in the case of uncontrolled pressure being applied to the package before heating begins).

10 The separate passage openings can be provided with underpressure valves acting at different pressure levels, and already known types of underpressure valve can for instance be applied for this purpose. It is also possible for the individual compartments to have passage openings with a total passage surface varying per compartment; these
15 can bring about a determined pressure level in a compartment only when the passage surface is sufficiently small. One or more passage openings can connect as desired to a single compartment. It is thus possible for instance to make use in a package of only a single dimension for all passage openings, wherein the number of passage openings is varied per compartment.

20 In an embodiment variant of the package according to the present invention which is simple and inexpensive to manufacture, the passage openings are blocked prior to use of the package by means of a cover element (sticker) fixed with an adhesive layer, wherein the adhesive layer softens at a determined temperature. For a further increase in
25 efficiency, such a cover element can also be used as information carrier relating to the content of the package, so that it serves a dual purpose. The cover element can moreover cover a plurality of passage openings as a single cover element, wherein weakened portions are then arranged in the cover element at the position of the passage openings, so that the cover element is released at the same moment at all positions
30 where it covers a passage opening. It is noted that it is also possible to vary this measure; a conscious choice can be made to arrange a greater or lesser degree of weakening so as to further vary the moment at which the different passage openings open. As material for the cover element it is possible to choose from any conceivable material, such as for instance plastic or paper. In a particular variant use is made of a

double foil layer, only one of the layers being provided with passage openings. Alternatively, the cover element can also be combined with the adhesive layer; an example hereof is an ink layer with which passage openings are closed.

- 5 It can be advantageous in practice for the passage openings to be arranged in the material layer (foil layer) with which the compartments are shielded from the environment. Such a foil layer is easy to provide with small openings and is generally situated on the top side of the package so that the product does not have to come into contact therewith (at least when the compartments are not fully filled), which, among
10 other things, reduces the risk of leakage. Alternatively however, it is also possible for the passage openings to be arranged in the container.

- In addition to the above described package, the invention also comprises an assembly of such a package and a plurality of products, in particular food products, placed in the
15 individual compartments. By means of this assembly the advantages can be realized as described above with reference to the package according to the invention.

- The invention also provides a method for heating to different temperatures a plurality of products according claim 12. The package can herein be heated with only a single
20 heating source; not only in a microwave oven, but also in a hot air oven, a warm water bath or other known heat source for heating food products in particular. The package can for instance be readily placed in an oven which feeds heat to the container, where after, provided the package is heated for long enough at a prescribed temperature, the different products in the different compartments are heated to the intended distinct
25 temperature levels without further intervention. After heating, the compartments can be made accessible for a meal by for instance detaching a material layer. It is particularly advantageous here if the material layer can be detached easily (also referred to as a peel-off attachment of the material layer). This reduces the danger, among others, of hot products leaving the container in uncontrolled manner. The heating according the
30 invention is highly efficient in relation to the prior art as partially shielding the product to be heated does not occur.

The invention will be further elucidated with reference to the non-limitative exemplary embodiments shown in the following figures, in which:

figure 1A shows a perspective view of a package according to the invention filled with food products before the start of heating,

figure 1B shows a perspective view of the package shown in figure 1A during heating,

figure 1C shows a perspective view of the package shown in figures 1A and 1B after

5 opening,

figure 2 is a perspective view of an alternative embodiment variant of the package according to the invention,

figure 3A shows a schematic cross-section through a closed passage opening,

figure 3B shows a schematic cross-section through the passage opening shown in figure

10 3A, now however in an opened position, and

figure 4 shows a schematic cross-section through yet another embodiment variant of the package according to the invention.

Figure 1A shows a package 1 provided with a container 2 which is covered with a
15 transparent foil 3 such that package 1 comprises three compartments 4, 5, 6 separated medium-tightly from each other and the environment. A sticker 7 containing product information is placed on foil 3. Package 1 is adapted particularly to contain food, and is generally kept refrigerated prior to use.

20 During heating of package 1, which is shown in figure 1B, the adhesive layer with which sticker 7 is adhered to foil 3 will soften (see also description relating to figure 3B). As a consequence partially released portions 8 of sticker 7 will be pressed upward by medium pressure exerted from compartments 4, 5, 6 on the partially released
25 portions 8 by means of openings (not shown) arranged specially for this purpose in foil 3. The openings in foil 3 are relatively small, and the number of openings in foil 3 can be varied at the position of the different compartments 4, 5, 6. It can be seen in the figure that two pressed-upward, released portions 8 connect onto compartment 4, one pressed-upward, released portion 8 connects onto compartment 5 and three pressed-upward, released portions 8 connect onto compartment 6. The pressure in compartments
30 4, 5, 6 will thus be able to vary. Once package 1 has been heated for a sufficiently long time, foil 3 can be pulled loose and food 10 in container 2 is accessible for consumption, see here for figure 1C.

Figure 2 shows a package 9 with a container 2, wherein more conventional valves 11, 12, 13 are placed in foil 3 which function at mutually differing pressures. The pressure in the individual compartments 4, 5, 6 can thus also be maximized at mutually differing values.

5

Figure 3A shows a schematic section through a foil 14 in which an opening 15 is arranged. A sticker 16 is adhered to foil 14 using an adhesive layer 17 such that sticker 16 closes the opening 15 in foil 14. A cut 18 is further made in foil 14. The situation shown in this figure corresponds to a situation of a passage opening in package 1 of figure 1A prior to heating of package 1. When package 1 is now heated the situation as shown in figure 3B will result. By means of pressure exerted on sticker 16 through opening 15 in foil 14, in combination with softening of adhesive layer 17 at a determined temperature and the cut 18, a sticker portion 19 will be pressed away from foil 14. The consequence hereof is that the opening 15 in the foil is left clear and will function as passage opening for medium (gases, steam and so on).

Finally, figure 4 shows yet another package 20, now however with two stacked compartments 21, 22. The lower compartment contains for instance soup 23, while the upper compartment 22 contains for instance soup balls 24 and soup vegetables 25. The upper compartment closes the lower compartment 21 and compartments 21, 22 are coupled to each other by a connecting element 26 to prevent undesired release of compartments 21, 22 from each other. The upper compartment 22 is closed with a foil 27 in which three passage openings 28 are placed, while a passage opening 29 is also provided in the bottom of the upper compartment 22. Package 20 is now dimensioned such that the pressure level in upper compartment 22 is maximized at a lower level than the pressure level in lower compartment 21. It will hereby be possible to heat soup 23 to a higher temperature than soup balls 24 and soup vegetables 25, which moreover also undergo a kind of steam treatment.

Claims

1. Package (1, 9, 20) for containing a plurality of products for heating, in particular food products (10, 23, 24, 25), comprising:
- 5 - a container (2), manufactured from a material for once-only use, provided with at least two compartments (4, 5, 6, 21, 22) shielded from the environment wherein the compartments (4, 5, 6, 21, 22) are separated medium-tightly from each other, and
- the individual compartments (4, 5, 6, 21, 22) are provided with passage openings (11, 12, 13, 15, 28, 29) for a medium for reducing overpressure in the package (1, 9, 10 20),
- characterized in that the passage openings (11, 12, 13, 15, 28, 29) of the individual compartments (4, 5, 6, 21, 22) differ from each other such that overpressure in individual compartments (4, 5, 6, 21, 22) is maximized at different pressure levels.
- 15 2. Package (1, 9, 20) as claimed in claim 1, characterized in that the compartments (4, 5, 6, 21, 22) are shielded from the environment by making use of a material layer (3, 14, 27).
3. Package (1, 9, 20) as claimed in claim 1 or 2, characterized in that the passage 20 openings (11, 12, 13, 15, 28, 29) are blocked prior to use of the package (1, 9, 20), and open under the influence of pressure in the compartments (4, 5, 6, 21, 22) .
4. Package (1, 9, 20) as claimed in any of the foregoing claims, characterized in 25 that the passage openings (11, 12, 13, 15, 28, 29) are blocked prior to use of the package (1, 9, 20), and open under the influence of a determined temperature being exceeded.
5. Package (1, 9, 20) as claimed in any of the foregoing claims, characterized in 30 that the separate passage openings (11, 12, 13, 15, 28, 29) are provided with pressure valves (11, 12, 13) acting at different pressure levels.
6. Package (1, 9, 20) as claimed in any of the foregoing claims, characterized in that the individual compartments (4, 5, 6, 21, 22) have passage openings (11, 12, 13, 15, 28, 29) with a total passage surface varying per compartment (4, 5, 6, 21, 22).

7. Package (1, 9, 20) as claimed in any of the foregoing claims, characterized in that the passage openings (11, 12, 13, 15, 28, 29) are blocked prior to use of the package (1, 9, 20) by means of a cover element (7, 16) fixed with an adhesive layer (17), wherein the adhesive layer (17) softens at a determined temperature.

8. Package (1, 9, 20) as claimed in claim 7, characterized in that a single cover element (7, 16) covers a plurality of passage openings (11, 12, 13, 15, 28, 29) and that weakened portions (18) are arranged in the cover element (7, 16) at the position of the passage openings (11, 12, 13, 15, 28, 29).

9. Package (1, 9, 20) as claimed in any of the claims 2-8, characterized in that passage openings (11, 12, 13, 15, 28, 29) are arranged in the material layer (3, 14, 27) with which the compartments (4, 5, 6, 21, 22) are shielded from the environment.

10. Package (1, 9, 20) as claimed in any of the foregoing claims, characterized in that passage openings (11, 12, 13, 15, 28, 29) are arranged in the container (2).

11. Assembly of a package (1, 9, 20) as claimed in any of the foregoing claims and a plurality of products, in particular food products (10, 23, 24, 25), placed in the individual compartments (4, 5, 6, 21, 22).

12. Method for heating to different temperatures with a heating source a plurality of products for heating, in particular food products (10, 23, 24, 25), placed in a single container (2), by heating with a heating source the container (2) with a plurality of separated compartments (4, 5, 6, 21, 22) provided with the products for heating (10, 23, 24, 25), wherein an overpressure is created in the compartments (4, 5, 6, 21, 22) which is bounded by passage openings (11, 12, 13, 15, 28, 29) connecting onto the individual compartments (4, 5, 6, 21, 22) characterized in that different passage openings (11, 12, 13, 15, 28, 29) of the individual compartments (4, 5, 6, 21, 22) maximize the pressure in different compartments at different pressures thus occurring different temperatures in the compartments (4, 5, 6, 21, 22).

13. Method as claimed in claim 12, characterized in that the container (2) is heated with a single heating source.

14. Method as claimed in claim 12 or 13, characterized in that the container (2) is
5 placed in an oven.

15. Method as claimed in any of the claims 12-14, characterized in that after heating the compartments (4, 5, 6, 21, 22) are made accessible for a meal by detaching a material layer (3, 14, 27).